The regurgitant volume of TR might increase dynamically despite unchanged effective regurgitant orifice area, thus exaggerating TR severity on echocardiographic assessment. Meanwhile, functional TR from various chronic and acute cardiomyopathies may significantly reverse either by itself or after medical treatment. Thus, integrated analysis on both cardiac imaging and clinical data of functional TR is requested before surgical decisions are made.

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REFERENCES

1. Calafiore AM, Iacò AL, Romeo A, et al. Echocardiographic-based treatment of functional tricuspid regurgitation. J Thorac Cardiovasc Surg 2011;142:308–13.
2. Nath J, Foster E, Heidenreich PA. Impact of tricuspid regurgitation on long-term survival. J Am Coll Cardiol 2004;43:405–9.
3. Ling LF, Marwick TH. Echocardiographic assessment of right ventricular function: how to account for tricuspid regurgitation and pulmonary hypertension. J Am Coll Cardiol Img 2012;5:747–53.

APPENDIX

For supplementary videos and their legends, please see the online version of this article.

Bicuspid Aortic Valve Phenotype and Aortopathy: Nomenclature and Role of Aortic Hemodynamics

We read with great interest the recently published paper by Kang et al. (1) regarding the importance of bicuspid aortic valve (BAV) phenotypic classification and its association with valvular dysfunction and aortopathy. The findings provide new and valuable data regarding risk stratification of BAV patients according to leaflet morphology. Of particular interest is the potential utility of this information, combined with knowledge of family history and hemodynamics (2), to provide a better understanding of patient prognosis.

Unfortunately, in the context of the existing literature, the authors chose unconventional nomenclature to stratify BAV phenotypes. In the paper, the term *BAV-RL* designates valves with free leaflets in the lateral position rather than the more common practice of describing fusion of the right and left coronary leaflets (3–5). Although somewhat arbitrary, this terminology contradicts the classification scheme adapted from one of the key references (3) and produces yet another naming scheme. The question of what constitutes a BAV-RL is sure to cause confusion amongst the community and in future research efforts where nomenclature swapping propagates and goes unnoticed. This highlights a growing need for a uniform classification scheme, similar to that proposed by Sievers et al. (4).

Furthermore, the discussion of aortic hemodynamic changes as a potential link between valve morphology and development of aortopathy is somewhat incomplete. Although we strongly agree that BAVs alter aortic hemodynamics, as has recently been shown by us and others, the assertion that left-handed helical flow exists in the BAV phenotype with free leaflets in the lateral position is unproven, with a single-center report in the literature.

Our experience is that the orientation of the flow helix is predominantly right-handed. We and others have shown that the incomplete opening of the BAV results in an abnormal flow jet dependent on the position of a conjoint leaflet. In the case of lateral leaflet fusion, the conjoint leaflet can cause a flow jet to reflect off of the inner arch curvature and impinge on the greater arch at a more downstream position, thereby causing helical flow with right-handed orientation (5). In addition, the authors did not address recent developments that have shown that magnetic resonance imaging can be used to directly quantify the impact of aortic valve disease on the aortic wall by means of metrics such as segmental wall shear stress (5). In this context, aortic wall shear stress is altered regardless of the orientation of helix flow and may be a more fundamental parameter to investigate for abnormal aortic remodeling.

In essence, we believe that the data of Kang et al. (1) are an important step toward understanding the role genetics and mechanotransduction may play in BAV-mediated aortopathy. We agree that advanced imaging techniques offer promising diagnostic imaging tools. However, a consistent description of the subtle variations in valve morphology, as well as newly developed in vivo metrics of hemodynamic changes associated with aortic valve disease, should not be overlooked: without a uniform classification scheme, we run the risk of confounding future efforts.

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REFERENCES

1. Kang JW, Song HG, Yang DH, et al. Association between bicuspid aortic valve phenotype and patterns of valvular dysfunction and bicuspid aortopathy: comprehensive evaluation using MDCT and echocardiography. J Am Coll Cardiol Img 2013;6:150–61.
2. Girdauskas E, Borger MA, Secknus MA, Girdauskas G, Kuntze T. Is aortopathy in bicuspid aortic valve disease a congenital defect or a result of abnormal hemodynamics? A critical reappraisal of a one-sided argument. Eur J Cardiothorac Surg 2011;39:809–14.
3. Buchner S, Hulsmann M, Poschenrieder F, et al. Variable phenotypes of bicuspid aortic valve disease: classification by cardiovascular magnetic resonance. Heart 2010;96:1233–40.
4. Sievers H-H, Schmidtke C. A classification system for the bicuspid aortic valve from 304 surgical specimens. J Thorac Cardiov Sur 2007;133:1226–33.
5. Hope MD, Hope TA, Crook SES, et al. 4D flow CMR in assessment of valve-related ascending aortic disease. J Am Coll Cardiol Img 2011;4:781–7.

REPLY: Bicuspid Aortic Valve Phenotype and Aortopathy: Nomenclature and Role of Aortic Hemodynamics

We thank for Drs. Barker, Robinson, and Markl for their interest in our paper (1). They were concerned about the potential confusion caused by our using the term *BAV-RL* to designate the spatial orientation of a bicuspid aortic valve (BAV) in cases where the right or left coronary cusp is fused with the noncoronary cusp. They